The file ex.red contains the REDUCE procedures e1, e2, e3, which expand 1-, 2-, and 3-loop results obtained by Grinder in ε (denoted by E).

The bare HQET heavy-quark propagator in d-dimensional space-time in an arbitrary covariant gauge has the form

$$\left[\omega\tilde{S}(\omega)\right]^{-1} = 1 + \mathcal{A}C_F I_1 \Sigma^{(1)} + \mathcal{A}^2 \sum C_i^{(2)} B_j^{(2)} \Sigma_{ij}^{(2)} + \mathcal{A}^3 \sum C_i^{(3)} B_j^{(3)} \Sigma_{ij}^{(3)} + \cdots \qquad (1)$$

where

$$\mathcal{A} = \frac{g_0^2(-2\omega)^{-2\varepsilon}}{(4\pi)^{d/2}}\,,$$

the 2-loop colour structures are $C_i^{(2)} = C_F \times (C_F, C_A, T_F n_l)$, the basis integrals are $B_j^{(2)} = I_1^2, I_2$; the 3-loop colour structures are $C_i^{(2)} = C_F \times (C_F^2, C_F C_A, C_A^2, C_F T_F n_l, C_A T_F n_l, (T_F n_l)^2)$, and the basis integrals $B_j^{(3)}$ are discussed in Sect. 2. The coefficients $\Sigma^{(l)}$ are in the file pd.red; they are called S1, S2, S3, and expressed via d and $\xi = 1 - a_0$ (the bare gluon propagator is $\left(g_{\mu\nu} - \xi p_\mu p_\nu/p^2\right)/p^2$). The same inverse propagator (1) expanded in ε is given in the file pe.red, as an expansion in

$$A = \frac{g_0^2(-2\omega)^{-2\varepsilon}e^{-\gamma\varepsilon}}{(4\pi)^{d/2}\varepsilon}\,.$$

The bare proper-vertex function $\Gamma(\omega, p)$ is calculated at the light-quark momentum $p = 0$. Its structure is similar to (1); the coefficients $V^{(l)}$ are in the file vd.red. Its expansion in ε is given in the file ve.red.

The file adim.red contains the anomalous dimensions $\tilde{\gamma}_Q$ (10), γ_q, $\tilde{\gamma}_j$ (13) and the corresponding renormalization factors, as well as two procedures to convert an anomalous dimension to the corresponding renormalization factor and back at three loops. The anomalous dimensions are truncated expansions in $\mathsf{As} = \alpha_s/(4\pi)$, and the anomalous dimensions in $\mathsf{Ae} = \alpha_s/(4\pi\varepsilon)$.

The file ren.red contains the renormalized propagator in the momentum space (formula (11)) and in the coordinate space (formula (12)).